

The number of perfect copies at present subscribed for does not exceed 190, of which upwards of 80 are subscribed for in America; and the expense of getting them up is so great, that not more than ten or fifteen copies above the number subscribed for, will be prepared,

The Establishment necessary for its publication will be broken up when the last Number is colored; and any application for the Work must be made to N. Berthoud, Esq., New-York; Dr. Geo. Parkman, Boston; Rev. Jno. Bachman, Charlestown, S. C.; James Grimshaw, Esq. New-Orleans, or W. G. Bakewell, Esq., Louisville; before the 1st of May next, as after that time no subscription can be received. New York, Jan. 11, 1838. jall eedSw"

THE CALL-NOTES OF SOME NOCTURNAL MIGRATING BIRDS.¹

BY WINSOR M. TYLER, M.D.

No matter how carefully we watch the land birds in our vicinity during the latter part of the summer with a view of ascertaining when they leave their breeding-ground to begin their southward journey, we rarely see any evidence of migration in Eastern Massachusetts before the middle of August. Our first intimation, perhaps, that a species has left us is within a few days of August 15. The Yellow Warbler's song then drops from the summer chorus. This species is common and sings freely until a certain day,—generally between the 10th and 15th of August; after this date we no longer hear the song and we no longer find the bird in the vicinity until weeks later, when a few migrants pass through this region in September. Although the Least Flycatcher's song period is over some time before that of the Yellow Warbler, this bird (the Flycatcher) lingers on its breeding-ground apparently, for it is not uncommon to find a silent Chebec on any day in August, and, like the Yellow Warbler, Chebees, as migrants, occur occasionally in September. But before even the Yellow Warbler has left our garden shrubbery, the autumnal migratory flight has been long

¹ Read on Jan. 17, 1916, at a meeting of the Nuttall Ornithological Club.

under way. Every night early in August, or even late in July, we may hear hundreds of bird-calls from nocturnal migrants, as they pass over head southward in the quiet and darkness.

For the past few years I have been much entertained and fascinated by listening from my sleeping-porch to the notes of these migrating birds. Being practically out-of-doors, my attention was naturally drawn to the frequent clear-cut "chips" and whistles; they were so distinct and sharp, and apparently so near, but withal so mysterious and baffling as to arouse my curiosity. One is at first impressed by the fact that most of the call-notes which he hears over and over again, often in great variety, are notes which he has never heard before, and consequently can ascribe to no known bird. Again, after a few years of observing, one realises that each year the notes (at first strange and unfamiliar, but finally perfectly recognisable from one another) occur in a definite order; as the season advances, one note after another makes its appearance, becomes frequent, and later drops out to be heard no more. Here then is a basis to work on. From the known times of migration of certain birds, is it not possible to identify the authors of some of the common nocturnal notes, or at least to surmise their identity with a fair degree of certainty?

During the very first nights of the autumnal migration (July 29 is my earliest date) the notes are always the same,—high and sibilant, with a sharp, ringing quality. The sound is represented so closely by the letters "ks" that I have called this note the "x" note. This call contains no vowel sound,—it is so short, indeed, that it cannot contain one—it is over almost as soon as it begins. In spite of the necessarily vague idea one receives from reading a description of so indefinite and fleeting a sound as a bird's "chip," this note is perfectly recognisable; after one has once become familiar with it, he can distinguish it readily even when it occurs, later in the season, with many other calls. The "x" note, as I have said, is the first note heard in the autumnal migration. It is commonest during the first half of August, when it is heard on favorable migration nights almost incessantly, evidently from thousands of birds, and it disappears soon after the first of September. From these facts we might deduce, that the species which uses the "x" note as a migration call is a nocturnal migrant which

breeds in large numbers to the north and northwest of us, that the species breeds also in eastern Massachusetts (for even when we hear the "x" note most frequently, we find in this region no species which have not bred here) and finally that its southward migration through this vicinity is pretty well over by the middle of September. I regret to say that, with all these data, I did not surmise the identity of the author of the "x" note until I saw and heard the note uttered in the daytime by the Oven-bird. Then it seemed self-evident that of all the possibilities, this species best supplied the conditions. The discovery also explained the early disappearance of our resident Oven-birds.¹

It may appear strange that the Oven-bird should give its nocturnal call by day (the call is distinctly different from any call used by the young or adult of this species) but under certain conditions, birds of several species add to their regular diurnal vocabulary a note absolutely novel, and in a few cases I have been convinced that they were using their migration call-note. Usually the birds uttering these notes are migrants,—either birds like Thrushes, remaining over a day or two between their night-flights, or Warblers, flitting southward through the trees, continuing, as they feed, their migratory progress. But birds about to migrate, as well as those already under way, signal to each other in a like manner.

Perhaps the most familiar example of this phenomenon is furnished by the Chipping Sparrow. Soon after the second brood of young is fledged, our local Chipping Sparrows gather into families or groups of a dozen or more. At this time, long before their departure in October, we hear from our open windows a bird-note which we have not heard during the early summer from the Chipping Sparrows which have bred within hearing. It is a note which to our ears suggests migration, both from its general resemblance to the indefinite "chips" which many migrant birds utter as they pass southward by day and by night, and also from the fact that the note is usually given when the bird is in flight. The Chipping Sparrow utters this note only when flocking, and it serves probably to maintain the unity of the flock. The effect of the migration calls, too, is to keep the companies together, but perhaps a more

¹ I have heard the "x" note only once in spring,—during the night preceding the arrival of the Oven-bird in Lexington.

important use of the call-notes is to express the feeling of migration and spread it, so that other birds may catch the contagion. In other words, we must not assume that a bird utters its migration calls with a definite purpose either of guiding its companions or of inquiring their whereabouts. Both of these results, however, are doubtless accomplished by involuntary utterances excited by the restlessness which culminates in migration. In any case there would be as much occasion for the notes which accomplish these results at the very start of migration, or even before the start, as at the subsequent steps of the journey.

It is possible that the migration calls are largely uttered by young birds and take their origin from the first note which the nestling makes,— the food-call. It is an easy transition from the food-call of the nestling to the call which the fledgling utters to inform his parents where to find and feed him, and this call, modified somewhat as the fledgling grows older, might well persist as an expression of emotion and become finally the migration call.

Some time in the second week of August, a new note makes its appearance, — a clear, but softly modulated, mellow whistle. This note is so loud and striking that one would expect that it would have attracted the notice of anyone who chanced to be out-of-doors at night. But, as far as I know, none but ornithologists have interested themselves in the sound.

For a long time this call-note remained a mystery to Mr. Faxon and Mr. Brewster, until finally Mr. Brewster, by a most fortunate chance, solved the problem. He was lying at dawn in his cabin on the shore of the Concord river, when he heard, far in the distance, the familiar whistle of the unknown migrant. The bird, still calling, flew nearer and nearer until it alighted in the shrubbery close by the cabin. Here it continued to call, but gradually changed the character of the note until, little by little, it grew to resemble, and finally became the familiar call of the Veery. This observation proves beyond any doubt that the Veery is the author of one of the whistles which we hear in the night during the times of migration and that the Veery's migration call is quite distinct from its notes heard commonly in the daytime. I should add that a small number of these calls (perhaps one per cent.) are identical with the Veery's diurnal "wheoo" call.

One other observer has published some evidence on this subject.

Henry H. Kopman (Auk, Vol. XXI, 1904, pp. 45, 46) heard the Veery utter by day a note which had puzzled him for years as he heard it from nocturnal migrants. It is evident, however, that he may not have differentiated this note from the calls of other Thrushes, for, although he had heard "countless hundreds" of the calls, he had noted less than a score of Veeries in ten years of observation, while he had met the Gray-cheeked and Olive-backed Thrush "in astonishing numbers" at the very season when he heard the nocturnal whistles.

The Veery call is most common in late August; my earliest and latest dates are August 12 and September 5. On some nights the calls come so frequently that, at times, there are but a few seconds between them; on other nights there is scarcely one to be heard,—a point of difference from the comparative regularity of the "x" note.

After the Veery call ceases for the season, there is generally an interval of about a week before a second whistle is heard. Although of the same general character as the Veery call, this late September whistle is pitched higher. It is of somewhat less duration, and is inflected downward very little, if at all, and lacks the terminal roll or roughness characteristic of the Veery call. My notes for the past four years indicate the migration period of this later bird to be between September 8 (an extremely early date) and September 27. I may say that these two "Thrush whistles" and the note next to be considered are so nearly identical that, for two or three years, I did not distinguish between them clearly, hence, I cannot use the dates contained in my earlier records. The late September call is a very frequent note on nights of heavy migrations,—so frequent as to indicate that it is uttered by a very common migrant. For this reason I believe that it is the call-note of the Olive-backed Thrush, in spite of the fact that of all diurnal bird-notes, it most resembles the whistled "hear" of *Hylocichla a. bicknelli*. An article in 'The Oölogist' (Vol. XXXI, 1914, pp. 162-166), by Paul G. Howes deals with the migration call of Swainson's Thrush. Mr. Howes' studies were made during the autumn of 1912 at Stamford, Conn. He describes the migration period as materially longer than my records indicate, his last bird passing southward on October 17. Mr. Howes was fortunate in being

able to watch the Thrushes drop from the sky into a small wood where he could afterward examine the birds at short range. He secured five specimens. Although I have gone out-of-doors in the morning twilight repeatedly in August on days when I have heard the whistles in great numbers before daylight, I have never seen the birds (Veeries at this date); as soon as it has grown light enough to make out a bird in the air, the calls have stopped and no more birds have flown over.

The Thrush calls heard during October, generally in the latter part of the month, are very similar to the Veery whistle. This third Thrush whistle is heard very irregularly,—on most nights none at all, but on a few nights in very great numbers. At this season of long evenings, it is not uncommon for the birds to start on their night flight as early as six o'clock. In tone of voice this note, a soft nasal whistle, resembles the Bluebird's call. It has, however, but one syllable and is inflected downward in pitch very slightly,—often not at all. The letters "Per" or "Ter" suggest the call. On October 29, 1913, I saw a company of half a dozen Hermit Thrushes repeat this note frequently as the birds flitted about in a gray birch wood. When they uttered the note they did not open the beak (at least at short range I could not see them do so), but at each repetition the feathers of the throat were slightly raised. During the previous night there had been a considerable flight of Hermit Thrushes and just before sunrise (a misty morning with a light S.E. breeze) I had heard numerous Thrush calls from birds passing overhead.

These three whistles heard respectively (roughly speaking) in August, September, and October account satisfactorily, I think, for the Veery, Swainson's, and the Hermit Thrush. The two other *Hylocichla*, the Gray-cheeked and Bicknell's, are of comparative rarity in Eastern Massachusetts and their periods of migration here coincide practically with the passage of the Olive-back. It is very probable therefore that I have not distinguished the calls of these rarer Thrushes because their voices vary little from the calls of the abundant Olive-back.

During the month from mid September to mid October there are more nocturnal bird-notes to be heard than any other time. The majority of these calls to my ear are identical to the common

diurnal note of *Dendroica striata*, viz. "tsit." On account of this correspondence and from the fact that at this season, Black-polls are passing through Eastern Massachusetts in numbers which at times seemingly surpass all other birds combined, I think it is no unfair assumption to ascribe this, the commonest note of autumn, to the Black-poll Warbler. As the season advances, many of the notes are more sustained than the abrupt "chips" which suggest the warblers, and resemble the "tseep" note which is used in the daytime by several of the smaller sparrows. These notes become progressively more frequent, reaching their maximum abundance, perhaps, toward the middle of October, and are the last notes heard in the autumn before the migration ceases. That these notes represent the passage of various species of Sparrows, I think there is little doubt. The frequent occurrence of these notes during the evening of March 28, 1908, at the height of the sparrow migration that spring increases the probability. As to the identity of many other notes heard during this period, I do not hazard even a guess. As an indication of the real individuality of some of the nocturnal bird-notes and of the actual ability of an observer to distinguish between them, I may say that during the remarkable flight of Cape May Warblers which passed through this region in September, 1914, I heard a note absolutely novel to me. I heard it before I saw any of the Cape Mays and of course had no idea what it was until I noticed that the Cape May Warblers used this note when they flew from tree to tree.

The migration note of the Bobolink is diagnostic; it is used by day as well as by night, but in my experience it is rarely heard at night, although it is a common note in the very early morning, after daylight, when the birds may be seen flying in flocks. My explanation of the rarity of this note at night is that the birds generally fly so high that their notes are nearly or quite inaudible from the ground. At other observation stations the Bobolink's note may, very likely, be heard more frequently. I was fortunate, one spring, to see numbers of Fox Sparrows start on their night flight soon after sunset. The birds flew northward, at first from one tree to another, uttering, while in the air, a note not dissimilar from one of their sibilant "chips." I heard this note that evening from birds flying through the darkness against a cold northwest

wind (April 4, 1908). Weather, indeed, appears to have little influence on the migration of birds, as evidenced by their call-notes, except that on fair nights the birds evidently fly high; the calls are fainter and appear to come from far away, whereas on nights when the sky is overcast (or when it is raining) the birds seem very near.

In watching birds during the seasons of migration or in listening to their call-notes night after night, it soon becomes apparent that, quite irrespective of the weather, certain nights are chosen to move northward or southward; there is either a migration or there is not. The birds appear to recognise the migration nights in advance as if the individuals of one (or related) species possessed the knowledge in common. My notes give a striking illustration of this point. "On October 11, 1914, in the late afternoon when Mr. Walter Faxon, Mr. Lewis Dexter, and I were crossing the Ipswich sandhills, Myrtle Warblers continually flew over our heads, all in a southerly direction. In ten minutes we counted twenty birds, flying at the height of a tall elm tree. We were standing among the dunes about a quarter of a mile from the sea. To the south was a small wood of pitch pines surrounded by sand, and as the birds were flying toward these trees, and as they appeared to fly lower as they approached them, we thought at first that the birds were seeking a roosting place. But when we entered the wood, we saw that, although the Warblers often dipped toward the tree-tops in their flight over the wood, they did not alight, but continued on toward the south. After watching the birds fly over for half an hour in a steady, if rather straggling, procession, we felt certain that they had begun a migration flight which they would keep up all night. We first noticed the birds between half past four and quarter to five, in broad daylight (sun set at 5.11). The birds were rather widely separated from each other as a rule, but occasionally one approached another and swooped at him. Once, when a bird was attacked in this manner, he came down into a thicket of bayberries, closely followed by his pursuer. The two birds remained in the shrubs but a moment, however, before rising and continuing their southerly flight. As the birds passed over head, they gave their characteristic "*tcheck*," and almost as frequently, the sibilant call heard most often when they take short

flights. As I have never heard the "*tcheck*" note during the night from migrating birds, I presume that Myrtle Warblers make use mainly, if not solely, of the sibilant note as a migration call, once the flight is well under way.

"On the afternoon of the 12th (the next day) the behavior of the Myrtle Warblers at twilight was very different. Mr. Faxon and I had spent the afternoon at Coffin's Beach, Gloucester, and toward dusk we crossed a broad area of level land, just back of the beach, grown up thickly with bayberry bushes, with a sprinkling of blueberry and a few pitch pine trees. This growth made a dense tangle of branches not rising more than six feet from the ground (except in the case of the pine trees) and over the whole expanse one spot was pretty much like another. Throughout this space, Myrtle Warblers were hopping about restlessly, chipping excitedly, and taking short flights. As it grew darker, the birds quieted; they remained longer in a bush when they found one to their liking and hopped among the branches, evidently searching for a comfortable and safe perch to sleep on. They allowed us to step very near them before they flitted away to a neighboring shrub. The birds did not appear to gather into flocks or companies; two or three, to be sure, might be examining the same bush, but everywhere over the area of forty acres or so, as far as our eyes could see, scattered birds were settling for the night; evidently there was to be no Myrtle Warbler migration. We noted these birds between 5 and 5.15 P.M. At this time there were no birds flying into the field as there would have been if the Warblers were assembling from a larger area."

It is not always possible to estimate the magnitude of a flight by the number of bird-notes heard during the night. Extensive migratory movements often occur in spring during a night when few, if any, notes are heard, and conversely, one is often surprised in the autumn to find the country practically barren of bird-life after a night during which birds' "chips" have been heard in great numbers.

This latter condition may be easily explained, I think. During the night the birds are passing in hundreds or thousands, but at dawn each bird or flock settles near wherever it happens to be. Hence in any one locality, once the stream is stopped, there will be

comparatively few birds,—only those which were nearly overhead at sunrise. As a matter of fact, some birds do not alight until long after sunrise, and some others continue their northerly or southerly progress after alighting in the trees, but the explanation above accounts for the seeming diminution of the number of migrating birds when the night's flight is over. To explain the heavy spring flights when no nocturnal notes are heard, it must be understood that bird-notes are very rare on any night in spring. The contrast in this respect between spring and autumn is so striking, that we are led to believe that during the spring nights, we do not hear notes from migrating birds because they do not utter them. If the birds do call during their northward journey, practically all of them fly at a great height, thus adopting a very different manner of migrating from their habit in autumn.

Although the problems presented by the two migration trips must be essentially the same to the birds, it should be remembered that the personnel of the migrating horde differs in one important respect;—whereas, in the autumn more than half of the migrants have never made the journey before, in the spring, every individual has safely accomplished at least one trip. We have surmised that the migration-call may be an outgrowth of the young bird's food-call. Taking into account the frequency in autumn of the migration calls, as opposed to their comparative absence in spring, may we not further surmise that it is chiefly the birds of the year which we hear calling during their initial migration and that these young birds, returning over the path they travelled six months before, and flying with the assurance and self-confidence which experience has given them, do not need migration calls for guidance or encouragement and therefore do not utter them?